



N5 Chemistry: Unit 1 - Chemical Changes and Structure REVISION

Lesson 19 - Rates of Reaction

Learning Outcomes

By the end of this lesson, you should have revised:

1. How to carry out an experiment to monitor the progress of a reaction
2. How to read a graph showing the course of a reaction
3. Factors affecting the rate of a reaction.

Success Criteria

You will have been successful in this lesson if you:

1. Watch the links provided
2. Complete revision questions provided
3. Complete and submit homework assigned

There is also a further reading section to help you gain more depth of understanding for this section.

If you have any questions about the content of this lesson, you should ask your class teacher either through your class MS team or via email. MS Teams will be monitored throughout the week by a chemistry teacher. If you need help or clarification with either the task or the content of the lesson, just ask.

Links to Prior Knowledge

You may wish to revise the following to help you understand this lesson:

- N5 Unit 1: Rates of Reaction

You do not need to copy any notes as this is all revision, but you should complete all questions and tasks as outlined in this document.



Watch the video first:

Lesson 19: Rates of Reaction -

<https://youtu.be/aByLk8hMkuU>

Factors affecting rates of reaction: <https://youtu.be/MLuOwNCEaRY>

You should also consult your Unit 1 Notes and printed notes to help further consolidate your knowledge. A digital copy of the printed notes can be found on the S4 Chemistry Team.

Further Reading

To learn more about rates of reaction, try the following online resources:

BBC Bitesize: <https://www.bbc.co.uk/bitesize/guides/zct4fcw/revision/1>

Read pages 1-6

Scholar: Log in through GLOW

National 5 Chemistry → Chemical Changes and Structure → Rates of reaction → try 1.1-1.5

Evans2 chem web: <https://www.evans2chemweb.co.uk/>

Username: snhs password: giffnock

Select any teacher → revision → National 5 → Unit 1 → Rates of Reaction

Extension Questions:

Yellow/Purple book

Rates of Reaction

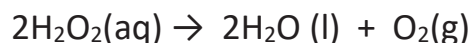
page 1-6



Complete the following questions in your class work jotter. The answers will be posted on Teams on Wednesday for you to self-assess.

Practice Questions – Rates of Reaction

1. Hydrogen peroxide solution decomposes to give water and oxygen.

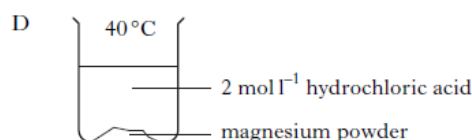
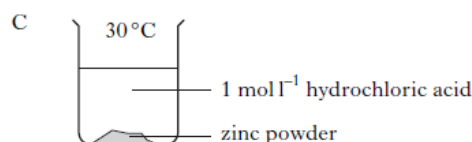
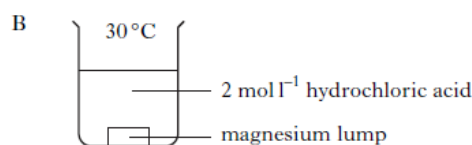
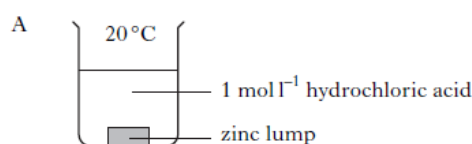


a) Draw a diagram to show how you could collect and measure the volume of oxygen gas being produced in this reaction. (2)

b) Sketch the graph you would expect to produce when measuring the oxygen gas production in the above experiment. (1)

2. Magnesium and zinc both react with hydrochloric acid. In which of the following experiments would the reaction rate be the fastest?

Explain your answer. (2)





3. Three experiments were set up as shown below to investigate the rate of the reaction between magnesium and dilute acid.

a. Name two variables which would have to be kept constant if the experiment was to be fair. (1)

b. Which reaction is faster, A or B? Explain why. (2)

c. Which reaction is slower, A or C? Explain why. (2)

Total: 10 marks



Past-Paper Questions – Rates of Reaction

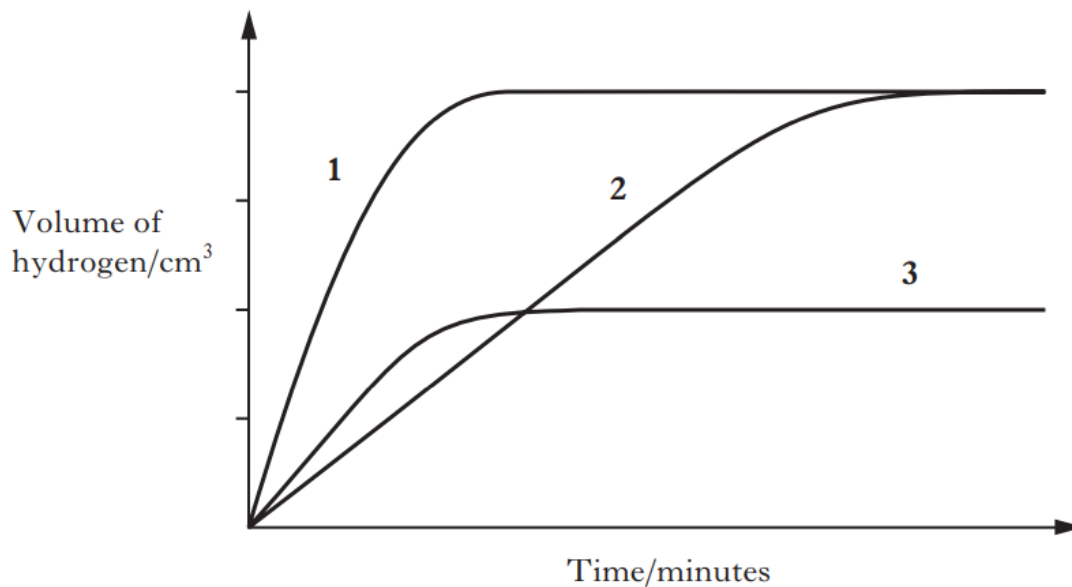
1. Which of the following changes would **not** speed up a chemical reaction?
- A Increasing the particle size
 - B Increasing the temperature
 - C Increasing the concentration
 - D Addition of a catalyst
- (1)
-
2. Which of the following pairs of reactants would produce hydrogen most slowly?
- A Magnesium powder and 4 mol l⁻¹ hydrochloric acid
 - B Magnesium powder and 2 mol l⁻¹ hydrochloric acid
 - C Magnesium ribbon and 4 mol l⁻¹ hydrochloric acid
 - D Magnesium ribbon and 2 mol l⁻¹ hydrochloric acid
- (1)

(questions continued on the next page)



3. A student carried out some experiments between zinc and excess 1 mol l^{-1} hydrochloric acid.

The graph shows the results of each experiment.



- a. In which experiment did the reaction take longest to finish, 1, 2 or 3?

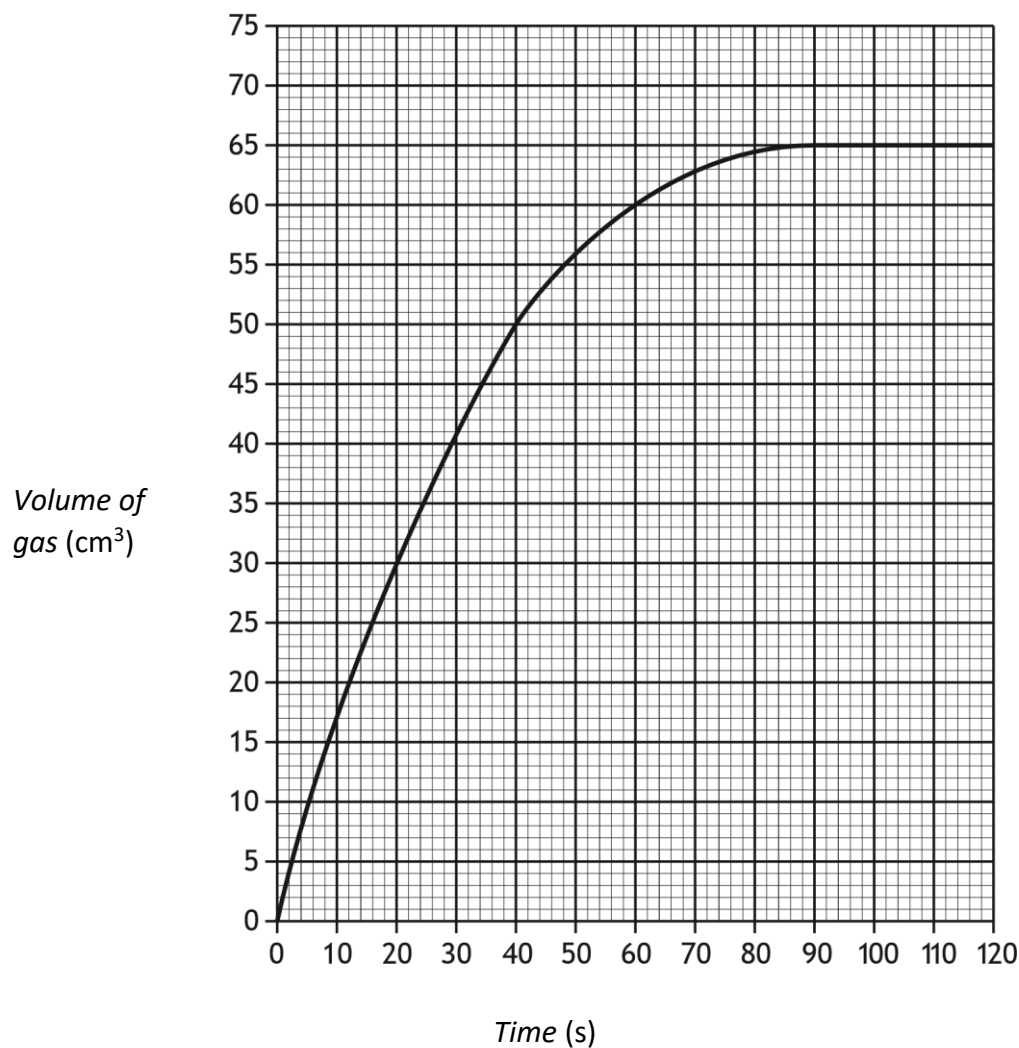
(1)

(questions continued on the next page)



4. Graphs can be used to show the change in the rate of a reaction as the reaction proceeds.

The graph shows the volume of gas produced in an experiment over a period of time.



- a. State the time, in seconds, at which the reaction stopped. (1)
- b. The graph shows that the rate of reaction decreases as the reaction proceeds. Suggest a reason for this decrease. (1)

Total: 5 marks



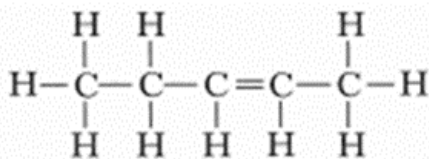
Now complete the Unit 2 Revision – Homework 2 on the next page and submit to your class teacher via Teams (or your usual channel).

*Photos of your work should be submitted by **1pm on Friday 5th March.***



Section 1 – 5 marks

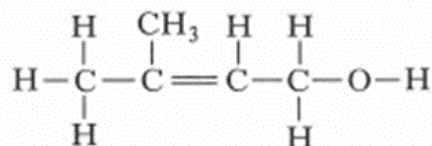
1.



The name of the above compound is

- A but-2-ene
- B pent-2-ene
- C but-3-ene
- D pent-3-ene.

4.



The above molecule is an example of

- A a saturated alcohol
- B an unsaturated alcohol
- C a saturated carboxylic acid
- D an unsaturated carboxylic acid.

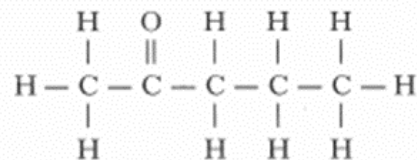
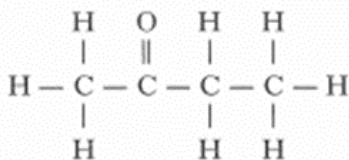
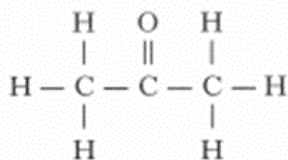
2.

A reaction is endothermic if

- A energy is required to start the reaction
- B heat is released during the reaction
- C the temperature drops during the reaction
- D the temperature rises during the reaction.

3.

The first three members of the alkanone series are:

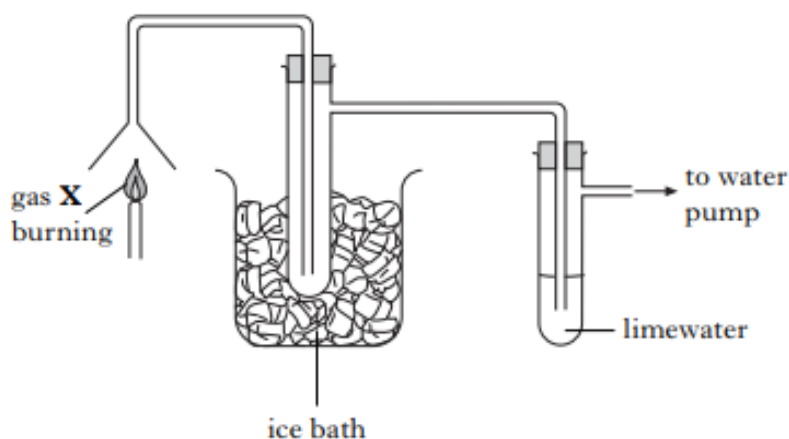


What is the general formula for this homologous series?

- A $\text{C}_n\text{H}_{2n-2}\text{O}$
- B $\text{C}_n\text{H}_{2n}\text{O}$
- C $\text{C}_n\text{H}_{2n+1}\text{O}$
- D $\text{C}_n\text{H}_{2n+2}\text{O}$



5. The apparatus shown can be used to identify what is produced when a gas burned



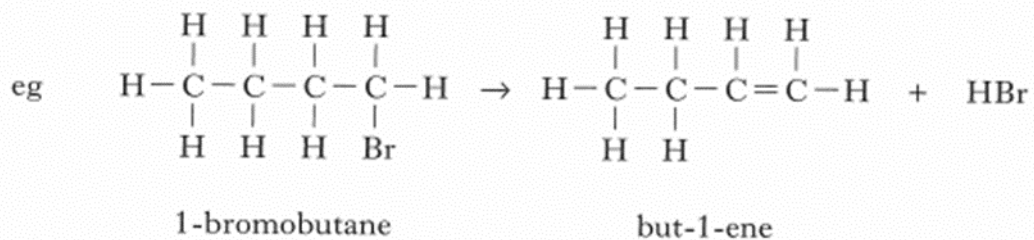
When gas **X** was burned, a colourless liquid collected in the cooled test tube but there was no change in the limewater.

Gas **X** could be

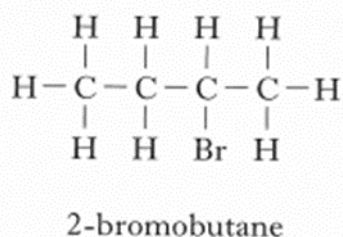
- A methane
- B carbon monoxide
- C hydrogen
- D ethene.

Section 2 – 12 marks

6. Alkenes can be made from bromoalkanes. Bromoalkanes are alkane molecules in which a hydrogen atom has been replaced by a bromine atom.

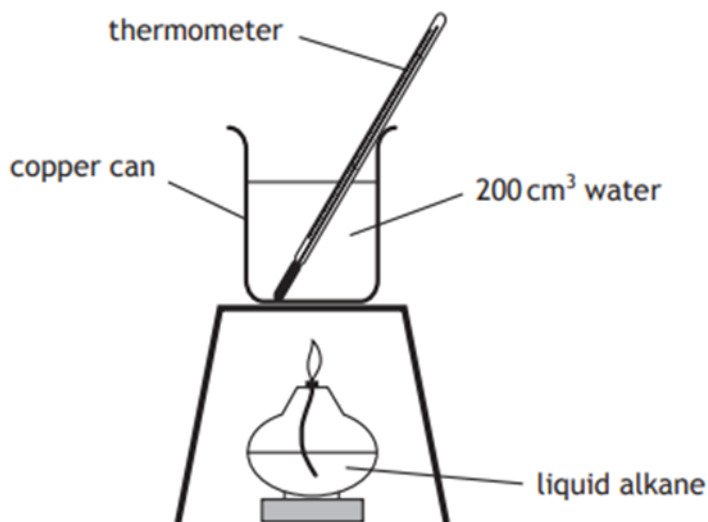


Draw the full structural formula for the **two** alkenes which can be formed from 2-bromobutane.





A student investigated the amount of energy released when an alkane burns using the apparatus shown.



The student recorded the following data.

Mass of alkane burned	1 g
Volume of water	200 cm ³

Energy released = 45.98 kJ

- a. Calculate the temperature increase of the water.
Show your working clearly. (3)
- b. Suggest one improvement to the student's investigation. (1)
- c. The table gives information about the amount of energy released when one mole of some alkanes are burned.

Name of alkane	Energy released when one mole of alkane is burned (kJ)
methane	891
ethane	1560
propane	2220
butane	2877

- (i) Describe the relationship between the amount of energy released and the number of carbon atoms in the alkane molecule. (1)
- (ii) Predict the amount of heat released, in kJ, when one mole of pentane is burned. (1)



8. a.

Draw the full structural formula for ethanoic acid.

(1)

b. To which family of compounds does ethanoic acid belong?

(1)

b. Vinegar is a solution of ethanoic acid, why can it be used in household cleaning products?

(1)

9. The table below shows a student's results of testing various hydrocarbons

Hydrocarbon	Molecular formula	Observation with bromine solution
A	C_6H_{14}	No change
B	C_6H_{12}	Bromine decolourises
C	C_6H_{12}	No change
D	C_6H_{10}	Bromine decolourises

a. Why does hydrocarbon D decolourise the bromine solution quickly?

(1)

b. To which homologous series does hydrocarbon C belong to?

(1)